VOLUME 2 - NO. 1 APRIL 1994

The Low Band Monitor

Post Dayton Depression

This years Dayton Hamvention™ actually was a survival test. The weather can go sour in Ohio at anytime during the month of April, but to have it be so dreadful for three straight days is a first for this (25 consecutive year) participant. There were a few good hours of flea market weather on Friday, that provided 60° temperatures and windless conditions. The rains came in the early afternoon on Friday and continued all day Saturday.

Sunday, the rains subsided, but the 40° temperatures equated to a 15° windchill. The flea market sellers were literally shut out this year, as only the hard core buyer would tolerate weather conditions this bad. I saw empty rows on Sunday at 1:00 p.m.

The 15,000 or so flea market refugees looked for shelter inside Hara Arena and this hoard of people simply grid locked the aisles and made normal communications with vendors impossible.

Luckily the forums this year were good and well attended by people who didn't have rain gear. The 3Y0PI presentation, by K0IR, at the Southwest Ohio DX Dinner was the best show this banquet has had in years.

One of the computer vendors, Debco Electronics, Inc., had the 3Y0PI log scrolling continuously on one of their computers. You could watch the 60,000 contacts, sorted by callsign, scroll across the screen as you realized that your call was due to show up in 4-5 hours.

My quasi-enterprise, Lance Johnson Engineering, passed on a commercial booth this year, after a ten year run in the same location. The basic booth cost went from $405.00 in 1993, to $500.00 in 1994, which is a healthy 21.1 percent increase. The price gouge, combined with the usual burn-out that eventually catches up to us all, converted me into a true Hamvention™ attendee for the first time in over a decade.

Even with the bad weather I had a wonderful time, roaming around the Hamvention™, feeling like a kid who just passed his first amateur radio exam. Some observations follow for those of you that missed this one:

1994 Hamvention™ Flea Market Prices - The following items were observed with the following "ask" prices. • Kenwood TS-930SAT, with two CW filters - $850.00. • Drake R4-C, high serial number, $150.00. • Collins KWM-2, winged, $425.00. • Silver Teflon PL-259, $1.00. • N Connectors, male, $1.70. • Bird 43 wattmeter, $125.00. • IBM AT System, 2 DD, 1 meg RAM, 20 meg HD, monochrome, $90.00. • Climbing Belts, $20.00. • Dumb Terminals, $10.00. • Eimac 4CX15000, with socket, chimney, $450.00. • Tailtwister Rotator, $250.00. • Eico Grid Dip Meter and Coils, $10.00. • Collins 30L-1, winged, $450.00. • Drake 2-B, $95.00. • Yaesu FT-1, $750.00. • 200' roll of 50 ohm 1/2" hardline, $50.00. • Eimac 8877, $250.00. • Sony Pro 80, $175.00.

Our Hamvention™ Flea Market "**Best Buy**" item choice: Discovered in one of the white tents of the flea market in the Southwest quadrant. A genuine "surplus" multi-channel, CIA receiving device used to decipher Russian transmissions from KGB agents during the cold war, at only $2,800.00.(A nice $98,000 discount). Cash only and no manual. This black box had the finest machine work and precision of anything in the electronic field I have ever seen.

1994 Hamvention™ Vendor Items - The following items were available from commercial vendors located inside the Hamvention™ that should be of interest to the low band DXer.

1. *Low Band DXing by John Devoldere, ON4UN* - The new updated version is available from anyone who sells ARRL books for only $20.00. John was also at the Hamvention™ and discussed 40 and 80 meter antennas at the Antenna Forum. A must have item!

2. *The Beverage Antenna Handbook by Victor A. Misek, W1WCR* - The Ham Radio Bookstore, (800) 457-7373, had the second edition for only $13.95. This fine 81 page book has been a tough find in recent years. Solid reference!

3. *W9GR 10 Mode DSP Kit from Quantics* - For a $125.00 you get the W9GR Digital Signal Processor with the latest firmware from Quantics, P.O. Box 2163, Nevada City, CA 95959. All you add is an enclosure, a 12 volt 500 ma. DC supply and $5.00 in appropriate jacks. Compare at $300.00.

4. *DX Talker™ from LTA* - This is a $40.00 software package that requires Windows™ 3.1 and a Sound Blaster compatible sound card. When installed, it enunciates all DX spots in perfect audio. Features an enhanced communications software that simplifies PacketCluster™ spotting commands. From LTA, P.O. Box 73, New Bedford, PA 16140. A fun and practical DX tool.

5. *3Y0PI - Peter I Island Antarctica, by KK6EK* - This 228 page book covers the recent 3Y0PI operation in great detail. Nice selection of charts and photo's and only $20.00. Contact KK6EK.

6. *AEA SWR-121-HF Graphical Antenna Analyst* - This device is not cheap at $399.95, but displays maximum and minimum SWR function and feedline return loss for any HF antenna. Can be interfaced with a computer by adding AEA's AACOM software, which allows plots to be saved to disk. Contact AEA, at (206) 774-5554. A great "club" accessory.

7. *Alpha 91B HF Linear from ETO* - This handsome new HF amplifier covers 160 through 10 meters and uses a pair of 4CX800A/GU74B tetrodes made by Svetlana Electron Devices of St. Petersburg, Russia. The 91B is an ETO design that will be configured and assembled by companies from this Russian joint venture and sold and serviced by ETO. Price to be announced.

Our Hamvention™ Vendor best "**Best Buy**" was discovered by Clark, W8TN, at a Radio Shack Booth. A 486-SX 25 mhz. system, FCC Class B Rated, SVGA Monitor with .39 dot pitch, with 130 MB HD, 4 Meg of RAM, 3.5" Drive, Microsoft™ Works, CD ROM at 375 ms. with multi-session and Photo CD capability, Windows™ 3.1, and MS-DOS 6.0, America Online, Sound Blaster Card, 4 CD's, MIDI - Game - Serial - Parallel Ports, Mouse and Keyboard for $999.95, with free U.P.S. Sure you want a 486-DX with a 50 mhz processor, .28 dot pitch SVGA and a Local Buss; but for a kilobuck this system was a great buy!

Conclusion - Dayton Hamventions™ are like DX Contests. Some years are better than others, but no matter what the current result is, you can't wait for the next one to happen.

See you in 1995!

Lance Johnson - Editor

Six For The Price of Three

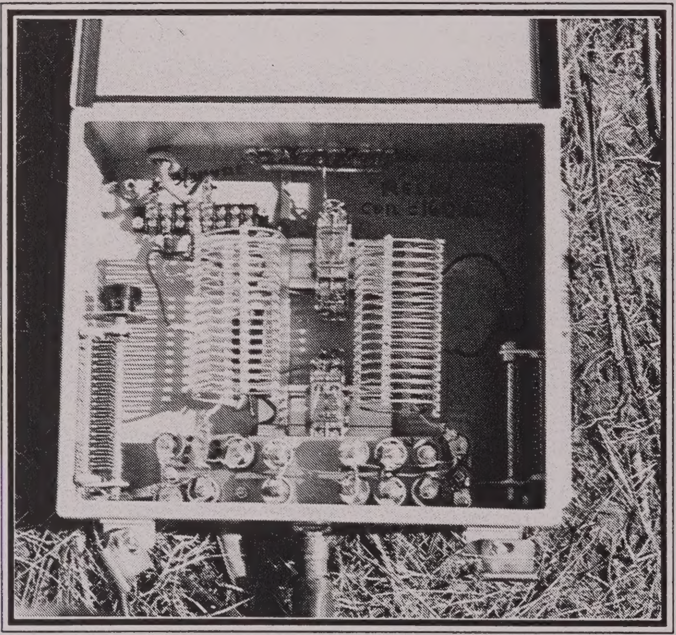
A Novel Approach To A 160 Meter Vertical Array - by KY0A

Editor's Note: Charlie Summers, KY0A, shares some details of his 160 meter 3-element vertical array with a Christman type feed system. By inserting an additional half wave phasing line, KY0A is able to direct the antenna in six directions instead of three. If you are looking for an homebrew antenna project this summer for "top band" this might be it. Enthusiasts on the 75 and 80 meter bands might also want to consider this innovative concept.

During the next two years conditions on the 160 meter band should improve significantly. Optimists might argue that any good 160 meter radiator will "make the trip" during the next few years and that the need for additional gain, front-to-back, and extreme low angle radiation won't be necessary.

Southern auto racing fans will also drink only Perrier water at NASCAR races and our nations national debt will also be eliminated during this period of low solar flux. Uh huh...!

Realists like Charlie Summers, KY0A, know that competition on 160 meters in future operating sessions will increase and the opportunity to work new DX paths with very short windows of time will exist during the solar minimum. Propagation opportunities like this only come around two to three times in ones lifetime. His system is an attempt to make the most of this propagation opportunity.



This weatherproof steel box houses two matching networks. The one on the left is used when the additional half wave phasing line is inserted. The one on the right is used when the half wave phasing line is bypassed.

A few decibels on the 160 meter band can take the "top band" enthusiast to a new operating level. Surprisingly, the cost of the array described here is rather nominal with respect to material acquisition. The amount of time necessary to implement the array is a different story. This is not a one weekend project! Lets review some of the projects key elements.

Towers and Real Estate - This array is located around the perimeter of a 120 foot tower. Each side of the of the array's equilateral triangle is 154 ft.- 8 in. The base of each vertical is located at the ends of the triangle. Twelve quarter wave length radials are connected at the base of each of the three vertical elements. This is certainly a big footprint when this antenna is implemented on the 160 meter band.

Vertical Elements and Radials - Each of the three one-quarter wavelength vertical elements is made with #12 solid copper wire supported by nylon rope that extends out almost horizontally from the top of the tower. The twelve radials at the base of each element are made up of assorted "available" insulated wire.

Feedlines and Phasing Lines - You will need to purchase two, 500 foot rolls of RG-213 coaxial cable (.66 velocity factor) for this project. You will need to cut the first roll of coax as follows for your phasing lines: (2) 121'-3.125" sections, (1) 56' - 6" section, (1) 177' - 5" section. These lengths were checked with a noise bridge. The second roll should be cut to (3) 100' sections for the individual feed lines. These are final lengths, so be sure to allow a few inches of each section to attach your connectors.

Antenna Relays - Six Leach, 32 volt ART-13, DPDT antenna relays were used. The half wave phasing insertion was accomplished with a 12 volt DPDT relay. These relays are housed in a weatherproof steel enclosure. Control cable and power supply considerations will vary depending on the distance to the shack, but should not present a technical challenge.

Christman Feed Method - The Christman Feed Method for a three element vertical array is outlined in the second edition of *Low Band DXing*, by ON4UN on pages II-90 through II-95. This system is attractive because it requires only two components, a capacitor and an an inductor.

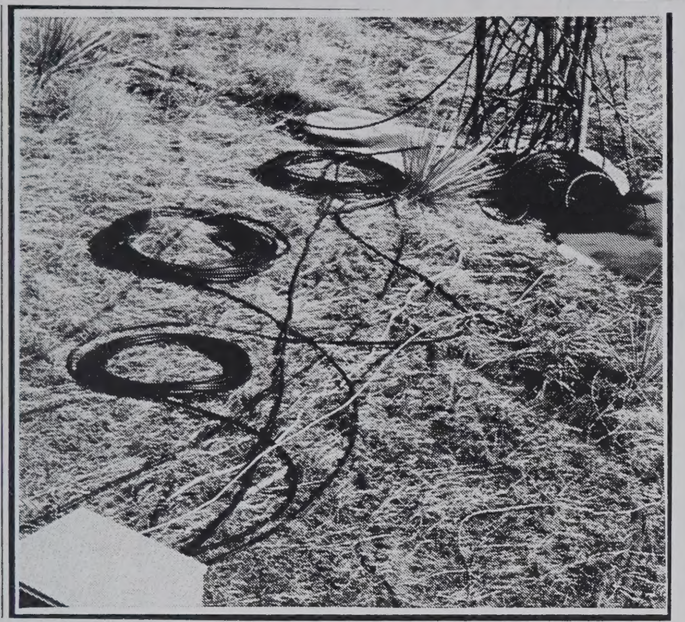
The KY0A system will require two of these matching networks. One is "stock" (2.6 µh. and 2550 pf.) the other is "retuned" (2.8 µh. and 2850 pf.) for the insertion of the halfwave phasing section. Appropriate air inductors, 5KV doorknob capacitors and 2KV air variables are used to create each network.. The selection of each network is achieved by energizing a 12 volt DPDT relay. The enclosure requirements will vary with the size of the components you are able to find to do the job.

Array Evaluation - To evaluate the actual KY0A array performance, three toroids are used as pickups or current sensors at the base of each vertical element. Three weatherized surplus T3537-L202 toroids of unknown manufacturer were selected for this purpose.

The choice of a pickup type is not critical, just make sure that all three current sensors are exactly the same. Remember, you want to be able to verify the relative amount of RF current flowing through of the array elements, not the actual current value.

Three equal lengths of RG-8X coax are attached to each toroid. These lengths are routed to an appropriate ammeter to observe the current distributions to each of the three vertical elements as each of the six different phasing selections are made.

The current sensors can be removed once the owner is satisfied that the system is working properly or left in the system to provide continuous monitoring capability.



The matching network enclosure is in the foreground. The three phasing lines follow. Notice the large (1/2 wavelength) coil of coax at the base of the Rohn 45 tower.

General Considerations - The key to good performance in any phased array, other than the precise electrical measurement of the phasing lines, is the owners ability to construct (in this case) three verticals with exactly the same impedance characteristics.

Initially one would think that this would be a relatively easy process. In some cases, like the owner who is a Kansas wheat farmer, it is. The wheat farmer can place the array in an isolated area, on perfectly flat land and not have to worry about the array elements electrically coupling to any surrounding objects. This coupling will change the characteristics of the individual vertical and disrupt the array's overall performance. Once he has addressed any problems with the potential electrical coupling to his tower (which can easily be solved) he is pretty much home free.

In other environments that have large trees, buildings, sloping terrain, telephone poles, power lines and other towers, the ability to construct electrically equivalent vertical elements is not always easy. For a "real world" installation, this will be the biggest barrier for the owner to overcome.

In the KY0A installation one of the verticals exhibited some unique impedance characteristics. Charlie was able to correct the situation by moving one of his 80 meter slopers and fine tuning some of the offending 160 vertical's radials.

Safety - SO-239 connectors were used at the base of each vertical so that the feedlines can be disconnected during the Colorado thunderstorm season. This method will protect the system's feedlines, switchbox, phasing lines and matching network when the array is not in use.

Performance - Published performance for an array of this type is of the order of 5 db. A front-to-back ratio of 15-22 db. is anticipated. Real world performance would indicate that this antenna is performing at and possibly beyond this level. The best bottom line performance test so far is a recent 160 meter QSO with V51Z. Conditions on 160 meters in May have not warranted an opportunity for additional detailed testing.

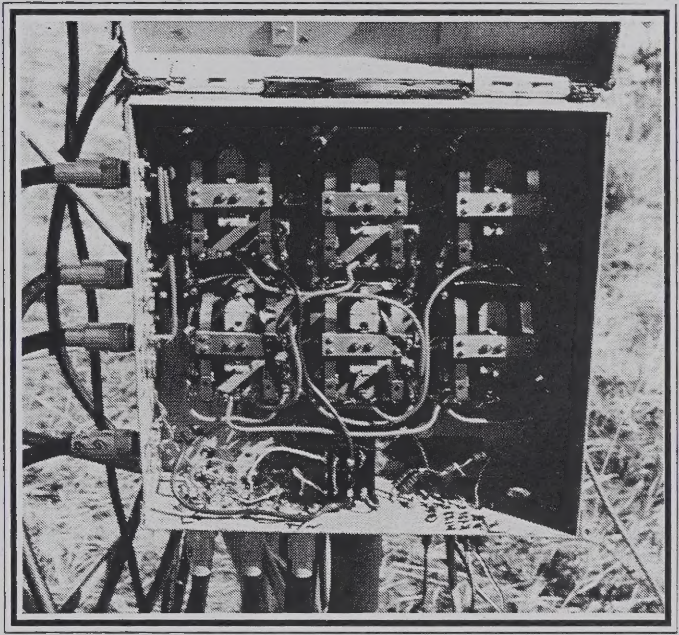
Summer Improvements - This project was executed in the dead of winter, with temperatures at or below freezing. The list of improvements scheduled for this summer follows:

1. Radials - Four more 1/4 wavelength radials will be added to the base of each vertical. More time will be spent on fine tuning the elevated radials.

2. Phasing Monitor - Phasing performance will be checked again after the improved radial system is added. This will verify that the array is still dynamically sound.

3. Matching Networks - Larger variable capacitors will be substituted to allow for more flexibility needed for tuning. A variable inductor from an ARC-5 transmitter will replace the fixed inductor on each side of the network to also allow for more tuning flexibility.

4. Cosmetics - All lead dress will be cleaned up when the system reaches it's expected operating potential. Phasing lines will be weatherized and placed above ground.



Six 32 volt ART-13 DPDT relays are used to steer the array. An additional 12 volt relay, available from Radio Shack, at the bottom is used to switch the additional half wave phasing line into the system. The jumper wire used between each relay is #8 solid insulated copper.

Conclusion - Some interesting concepts have been presented here by KY0A, that should be of help to anyone who is interested in implementing a phased array on the 160 meter band. It is obvious that the amateurs that attempt an array of this type never really "complete" the system, as improvements can always be made in the cosmetic aspects of the system.

The obvious choice of using more variable versus fixed components for constructing the matching networks will typically be determined by the local availability and cost of these items in your local market.

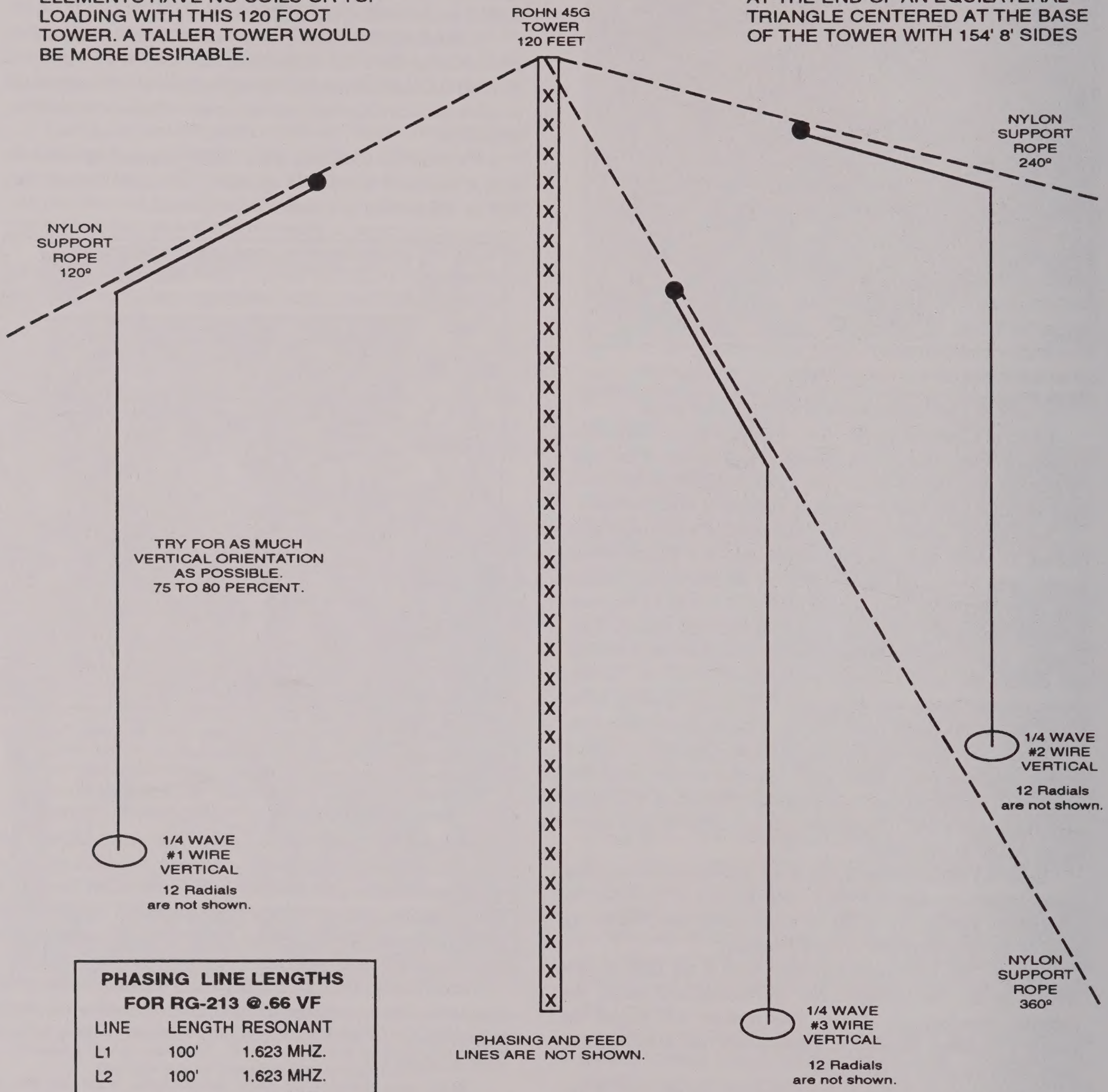
Both approaches have their advantages, with the use of variable components giving the owner the ability to tune the system to a finer degree in a shorter period of time.

Editors note: The Low Band Monitor will continue to monitor the evolution of the KY0A system during the next low band season. Additional articles on phased arrays are also planned in the next few months.

KY0A 160 Meter Phased Vertical Array

NOTE: THE THREE VERTICAL ELEMENTS HAVE NO COILS OR TOP LOADING WITH THIS 120 FOOT TOWER. A TALLER TOWER WOULD BE MORE DESIRABLE.

NOTE: EACH VERTICAL IS LOCATED AT THE END OF AN EQUILATERAL TRIANGLE CENTERED AT THE BASE OF THE TOWER WITH 154' 8' SIDES


ROHN 45G TOWER 120 FEET
NYLON SUPPORT ROPE 240º
NYLON SUPPORT ROPE 120º
TRY FOR AS MUCH VERTICAL ORIENTATION AS POSSIBLE. 75 TO 80 PERCENT.
1/4 WAVE #2 WIRE VERTICAL
12 Radials are not shown.
1/4 WAVE #1 WIRE VERTICAL
12 Radials are not shown.
NYLON SUPPORT ROPE 360º
1/4 WAVE #3 WIRE VERTICAL
12 Radials are not shown.

PHASING AND FEED LINES ARE NOT SHOWN.

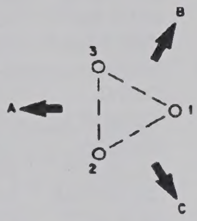
PHASING LINE LENGTHS FOR RG-213 @.66 VF

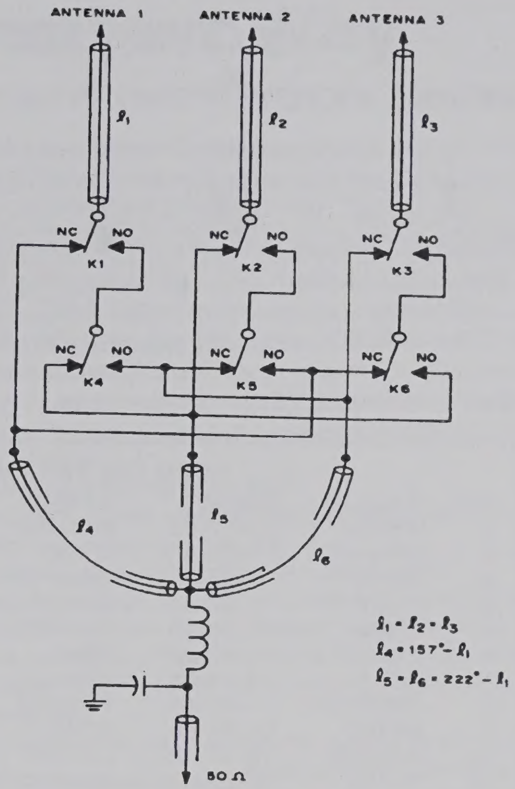
LINE	LENGTH	RESONANT
L1	100'	1.623 MHZ.
L2	100'	1.623 MHZ.
L3	100'	1.623 MHZ.
L4	56' - 6"	2.874 MHZ.
L5	121' - 3"	1.338 MHZ.
L6	121' - 3"	1.338 MHZ.

Christman Feed Method for a Three Element Vertical Array

This system was reviewed in the second edition of Low Band DXing by ON4UN on pages II-90 through II-95. It requires six relays and three phasing lines, which provides you with three (30° - 150° - 270°) array directivities.

	DIRECTION		
RELAY	A	B	C
K1	O	X	X
K2	O	X	X
K3	O	X	X
K4	O	X	O
K5	O	X	O
K6	O	X	O

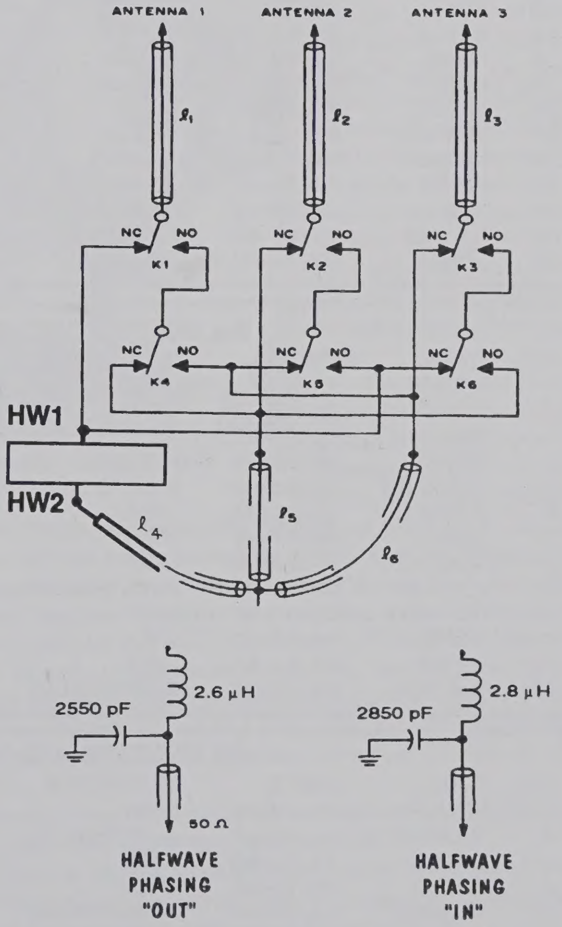




Additional Half Wave Phasing Modification Developed by KY0A

The half wave phasing line is switched into the array at HW1 and HW2 with a 12 volt relay. Note the second matching network. When the halfwave section is switched into the system between HW1 and HW2, the first network is bypassed. The second matching network is switched into the system yielding additional 90°, 210° and 330° vectors that can be selected by the operator.

	SWITCH SELECTION		
DIRECTION	S1	S2	S3
30º	O	O	O
90º	X	O	X
150º	X	O	O
210º	O	O	X
270º	X	X	O
330º	X	X	X
RELAY	K1+K2+K3	K4+K5+K6	PHASE Ø



Low Band Monitor Awards

VK4MZ, VK3EW, K3ND, NT4O and K8YSE Lead April Achievers

Our low band season came to a close on April 15, 1994. We again commend those who made the effort this season.

160 Meters - K8YSE, #25 and NT4O, #26 join the list of Worked All Continents achievers with two fine entries. Note the Asian contact used by NT4O. That's real quality Mike!

80 Meters - Last minute entries by VK4MZ, K8YSE, K3ND, NT4O and VK3EW give us thirteen subscribers that have qualified at the 100 country level. We will provide more information about these 80 meter guru's in a future issue.

40 Meters - David McAuley, VK3EW, also submitted a fine entry on 40 meters qualifying for 40 meter 150 Country Award #5. The 40 Meter Award presented more of a challenge than we originally anticipated. David joins a very elite group.

During the summer, we will integrate the band data from our award winners into our Propagation Study.

Previous 40 and 80 Meter qualifiers are asked to send us your "FINAL" band country figures, so they can be recorded in the Propagation Study.

160 METER WORKED ALL CONTINENTS 1993-94

NO.	CALL	DATE	AFRICA	ASIA	EUROPE	N. AMER.	OCEANIA	S. AMER.
1	KY0A	11-17-93	6W6JX	JA1CGM	JW5NM	VE3BW	VK6ACY	P40W
2	W8UVZ	11-20-93	ZD8Z	JA1CGM	UB5ZAL	KL7Y	VK4YB	PY0FF
3	K3ND	11-27-93	EA9EO	4X/S59PR	ZB2X	VP5RX	KH6CC	P40W
4	AA6TT	11-27-93	EA8BR	JH1RES	TM7C	VP5L	3D2OH	9Y4H
5	W8AH	11-30-93	EA9EO	4X4NJ	YO3APJ	FM5BH	KH6XT	9Y4H
6	W0CD	11-30-93	ZD8Z	JF1NZW	G3SZA	FJ/F6HWU	3D2AW	P40W
7	K0CS	12-03-93	6W6JX	4X4NJ	PA0HIP	V31DX	KH6CC	9Y4H
8	GW3YDX	11-27-93	VQ9QM	RA9FBT	GU2FRO	WA3EUL	ZL2JR	P40W
9	AB0X	12-23-93	ZD8Z	JA1CGM	DK6WL	K5NW	KH6AT	9Y4H
10	W8JGU	12-15-93	ZD8VJ	JA3ONB	4K2MAL	WA4DRU/VP5	VK6ACY	9Y4H
11	K9FD	12-26-93	9G1XA	JA3ONB	UB5ZAL	HH2PK	VK5BC	WS4E/YV5
12	N5WA	12-27-93	EA8PP	JA6HUG	G3PQA	V47KP	KH6CC	9Y4H
13	WB9GYU	01-06-94	ZS6EZ	JA1CGM	JW5NM	HR2IQC	VK6HD	9Y4H
14	W0ZV	11-27-93	5N0MVE	4X4NJ	Z30M	TI1C	KH6CC	9Y4H
15	K4ODL	11-18-93	ZD8Z	JA1HQT	GI0KOW	KL7Y	VK6ACY	P40W
16	NI6T	12-20-93	ZD8Z	JA7OEM	G3RBP	VY1JA	3D2OH	P40W
17	N4KG	01-13-94	EA8PP	JA1CGM	S59UN	K9BG/VP5	FK8CP	4K1F
18	NX0I	12-25-93	ZD8Z	JA7BXS	IV3PRK	YS1X	V7X	HC0E
19	K4IBP	01-30-94	6W6JX	JA1HQT	ON6ACG	KF7S/KL7	KH6U	9Y4H
20	WB9Z	11-27-93	ZD8Z	S59PR/4X	UC2WAF	TI1C	KH6AT	P40W
21	K4KUZ	02-11-94	C52ZP	4X4NJ	OT4T	VP9AD	KH6CC	P40O
22	K4SB	11-27-93	EA9EO	4X4NJ	SM5EDX	FJ/F8UFT	VK3AJJ	PY1BVY
23	KX4R	11-28-93	EA9EO	4X4NJ	LY7A	V47KP	KH6AT	PJ2/WJ2O
24	N4JJ	11-28-93	EA8EA	JA7OEM	G3LNS	NL7G	VK6HD	8R1K
25	K8YSE	03-15-94	A22MN	JA3ONB	CT1AOZ	AL7MX	ZL2JR	9Y4H
26	NT4O	03-18-94	ZS6EZ	A71CW	4K2MAL	TI9CF	KH6CC	4K1F

80 METER WORKED 100 COUNTRIES 1993-94

NO.	CALL	DATE	COUNTRY	STATE	SUBMITTED	LATEST
1	W8AH	11-26-93	USA	WEST VIRGINIA	108	108
2	K9FD	12-30-93	USA	ILLINOIS	106	106
3	NI6T	12-20-93	USA	CALIFORNIA	119	145 FINAL
4	N2KK	12-05-93	USA	CALIFORNIA	106	106
5	WB6JPY	02-03-94	USA	CALIFORNIA	107	148 FINAL
6	K6SSS	02-09-94	USA	CALIFORNIA	126	132 FINAL
7	N4KG	03-01-94	USA	ALABAMA	120	133 FINAL
8	W8UVZ	11-28-93	USA	MICHIGAN	105	105
9	VK4MZ	04-04-94	AUSTRALIA	QUEENSLAND	104	104 FINAL
10	K8YSE	04-01-94	USA	OHIO	102	102 FINAL
11	K3ND	04-13-94	USA	PENNSYLVANIA	103	103 FINAL
12	NT4O	04-14-94	USA	NORTH CAROLINA	145	145 FINAL
13	VK3EW	04-15-94	AUSTRALIA	VICTORIA	108	108 FINAL

40 METER WORKED 150 COUNTRIES 1993-94

NO.	CALL	DATE	COUNTRY	STATE	SUBMITTED	LATEST
1	W8AH	11-26-93	USA	WEST VIRGINIA	157	157
2	VK4MZ	01-13-94	AUSTRALIA	QUEENSLAND	166	191 FINAL
3	N4KG	11-30-93	USA	ALABAMA	172	193 FINAL
4	K9FD	02-18-94	USA	ILLINOIS	151	151
5	VK3EW	04-15-94	AUSTRALIA	VICTORIA	162	162 FINAL

Around the World the Hard Way

Southern Sudan and Back - by David Schoen - N2KK

Editor's Note: This is the conclusion of the 1980 - 1981 DXpedition by David Schoen, N2KK, to 4S7, 8Q7, J20, ST2 and ST0. We conclude this story with Dave's account of his Southern Sudan activity.

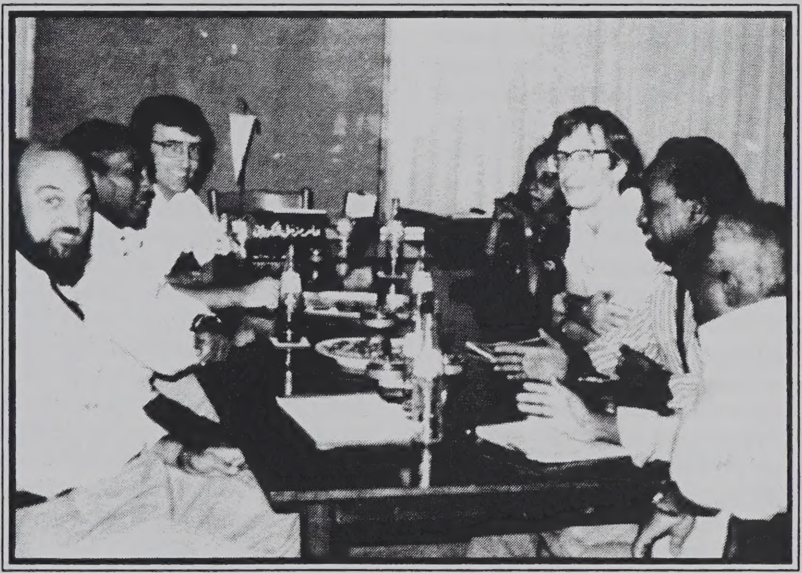
The Southern Sudan Operation - The Sudan Airways airplane landed after an uneventful 45-minute flight and without turning off it's engined off loaded the passengers and baggage, took on a few more passengers and was gone within ten minutes. I did not know at the time (December 22) that almost all flights would be cancelled in the next two weeks even though daily flights are scheduled. The baggage was taken to an open field and unceremoniously dumped on the ground. I was suddenly in Black Africa. Khartoum, in the North, is Arabic, the Southern Sudan is different in race culture and politics.

I had no idea where to stay, but Frosty, K5LBU/ST0, knew I was coming and after 30 minutes or so showed up on a motorbike. Since there were not so many European people around, we had no trouble finding each other, even though we had never met. Frosty took me to the Juba Hotel, where Marty, OH2BH, had been in June of 1980.

Within an hour, I had the vertical up and the whole system working fine. On my first chance at longpath I could only work New Zealand and Australia on 80 meters at around 1530 UTC. This was still the 22nd of December. Frosty had promised to loan me a three element tri-band beam, but changed his mind. I only had my 80 meter vertical.

The next day I started at 4:00 am local time and managed 30 U.S. stations through 20 over 9 noise due to a thunderstorm. I heard W0SD calling me from South Dakota and gave him a couple of reports that I wasn't sure he heard. After sunrise I went to 10 meters and worked steadily through the day managed 500 U.S. contacts.

Again I tried longpath on 80 meters at 1500 UTC with even less success. Only YU2HA and a few other European stations could hear me. I then went to 40 meters and found a pile-up of TR8's, TN8's, and 9X5's. This was really fun. I had an early dinner and then disaster struck...



SUDAN AMATEUR RADIO CONFERENCE - From L. to R. DF3NZ,ST2SA, DK5BD, SWL, N2KK, SWL, ST2FF.

They came for me at 10:30 that night as I was falling asleep.

There was a sharp rap on the door, a voice shouting "police" and suddenly I had machine guns pointed at me. They weren't bandits; the guys with the guns were three uniformed soldiers plus four men in street clothes. Two of them seemed to be the bosses. A small balding man, so excited he was literally spitting out his words, was screaming in bad English, What is that?" and pointing at the radio. I caught something about "spy" as he jabbed me in the chest while being nearly incomprehensible. It was difficult to move with guns pinned to my chest. This was not a time for rational conversation.

The soldiers looked confused, only the little man was shouting. The "bosses" and a tall roly-poly gentlemen were conversing. I later found out that the little fellow was the Chief of Police, a General and the roly-poly fellow was his superior, Mohammed Abdul Aziz, the head of security in the South, the highest authority in Southern Sudan. The General wanted to put me in jail, but Mohammed overruled him.

They decided to take the radio, leaving a guard at the door of my room. I said no at first, thinking of all the guys on the East Coast who would be on the air the next morning. Reluctantly, with the threat of not making it through the night, I disconnected the radio. They took the radio and then left quickly. At that point I didn't know who they were or where they were taking my equipment. They told me that they would return later. I was left alone except for the guard, who was posted outside the door.

At this point, I began to shake violently. I had felt calm at first, but now I felt very numb and confused.

I sought out Frosty the next morning after a largely sleepless night and while I was beginning to be angry and frustrated, he seemed to take it with an air of joviality.

"Well I'll be, they took your radio, huh?"

Frosty took me to a safari company with a 40 meter radio link to Khartoum where I sent a message to Dr. Sid.

"Radio confiscated by police at gunpoint - please help."

At that point, I thought Dr. Sid would fix it without any problem. He had asked me to let him know of any problems I had. There was no response from Khartoum; there are no telephone links with the outside world and no roads. I also found out that all outgoing flights had been cancelled "indefinitely".

This was December 24, Christmas Eve. No one at the hotel wanted to talk to me as they seemed a bit afraid. A room clerk told me a few names and then I started to understand more about my problem.

The Libyan's had invaded Chad and just days before had taken N'Djema, the capital, pushing the Moslem Rebels to the Sudanese border. Sudanese and Egyptians were supplying the rebels with arms and supplies in the Southern Sudan where I was located. No one knew which side I was on and I had a radio transmitter which in the Sudan signifies troop movements.

The Juba Hotel, being the only hotel for hundreds of miles around is the gathering place, although it is quite humble, for all the government officials and the U.N. Aid people. I learned that Mohammed Abdul Aziz was going to arrive at 6:00 pm for his usual drink. When I approached him and said, "Mohammed, may I have a word with you?" He said, "How did you know my name," in a friendly manner. He was willing to talk and when he found out that I knew Dr. Sis, said, "I knew him in Wad Medani fifteen years ago!" This really opened the conversation up, since he knew Sid wasn't a spy. In fact, Mohammed expressed interest in learning about amateur radio. He told me that if I could get any piece of paper, anything official looking, he would give my radio back to me and I could resume my operation.

One hour later I was sending a second message to Dr. Sid through the safari organization's radio link with Khartoum.

Christmas day was spent at Frosty's house in the American compound of the S.I.L. (Summer Institute of Linguistics); a religious group devoted to translating the bible into different languages.

Frosty guides in the S.I.L. aircraft and those of the U.S. Aid and has a ham radio station at the Ministry of Education next to the aircraft radio. He has a 5 mhz. commercial license. He also uses the radio station at Juba University, called a "Long Distance Engineering Project", co-sponsored by Juba University and Simon Fraser University in British Columbia.

There was a 3 element beam that was bent at a crazy angle by wind damage on the roof and an FT-101E and FL-2000B inside. The line voltage that powered the building seemed to be off during most of the day. Frosty also kept a small transceiver at his house because neither his wife nor his boss was keen on having the radio without some paperwork to back it up. Frosty had also been trying to get some documentation from Dr. Sid, but so far he had had no success.

After a Christmas dinner of Butterball turkey, which they had been saving for a long time from the United States, Frosty and I rode over to the station at the University and tried to raise someone on 15 meters without success. I was hoping to raise some of the European operators to get in touch with Gunther, DF3NZ/ST2 or Dr. Sid, as I really felt I had a good chance to get back on the air. No contacts were made at all. The bent antenna had obviously been rendered useless by the wind.

The next day, December 26, I began to get very sick from the food I had been eating for the last twelve days. The fish always smelled of gasoline and the meat also had a peculiar odor. I would usually go a day or so without eating, but hunger would eventually force me to eat something.

The days were hot and humid. I spent the time lying on my bed reading anything at all in English waiting for Mohammed Abdul Aziz to come to the Hotel around 6:00 pm for coffee and our daily "conference". Frosty had gone to the Kenya border to pick up some personal belongings that were stuck at customs. He was gone for a week, but did some operating from LA1RR/ST0 in Tharit and had some success on 20 meter longpath to the U.S. West Coast. Tharit is halfway to the Kenya-Uganda border, about 80 miles of fairly tough roads to the south. During that time period there was also an ST0AS station operating from the south. Some of us speculated that this was a German operation, but Dr. Sid had never heard of him and I know that he wasn't operating in Juba.

Every day I pressed Mohammed for an answer. Every day he recommended that I be patient. There was no answer from Dr. Sid. On Monday, December 29, there was another flight to Khartoum, so I asked Mohammed if there was any use to wait around and he said, "Wait one more day". By now he was an ally and was proposing to the Security people in Khartoum to return my radio equipment to me. Although I was afraid there would be no more flights for another two weeks and the food was terrible, the chance to operate again was too great. I decided to wait.

The next dat Mohammed looked glum; he told me the answer for additional operating was no. I would be able to get my radio back, but there would be no flights out until Friday or Saturday.

Frosty showed up on Friday afternoon, back from his journey to the Kenya border, all smiles. I told him I'd had enough of the Southern Sudan for the present and had no more chance to operate. He suggested that I talk to Dr. Sid again. At 7:30 am on Saturday, January 3, as I was waking someone up to pay my hotel bill, Frosty showed up again.

"Hurry, the plane is coming; I heard it on the radio; it will be here in twenty minutes," he said.

The hotel had no idea what my total was, so I paid an estimated total and left in a battered twenty-year-old taxi to get my radio from Mohammed's office. Frosty was there, chatting amiably. I had introduced them to each other a few days earlier, thinking it would strengthen his position there, as it's always a case of "who you know" there. We heard the roar of the airplane upon landing. Mohammed had ordered it held since I was going to be late.

I left Juba with a sense of futility since I had accomplished nothing in terms of operating. I had met every minister there in an attempt to get my radio back and had made friends all around. When I left no one had felt that I was a spy. The General who had pushed me around the room in the dead of night had also gruffly apologized for the incident. Mohammed said, My friend has a bad temper and we all thought you were a spy."

I would feel okay about going back there. Maybe I will someday, but what scares me most is the food. This was the first time after visiting a number of countries that I had become seriously ill.

I've sent some of the Ministers in the South subscriptions to *Time* and *Newsweek*. One even requested a subscription to *Penthouse*. I have been sending Mohammed some amateur radio magazines and reference manuals.

Three months after leaving Juba, I discovered that Frosty had been ejected from the Sudan and his radio was confiscated. I never did find out any of the details. The Southern Sudan certainly requires constant diplomacy!

Back To The Sudan - The vertical was back up at Green Village within an hour of my arrival I was getting ready for more 80 meter activity. I decided to operate on 80 meters only so I could keep a low profile. I had worked all 50 states on 10 meters, with 1,300 contacts before I had left for the Southern Sudan.

I called Dr. Sid on the phone to see why I had received no response to any of my three radio messages. He was no longer friendly. Apparently he thought I had committed a terrible blunder in the South by getting caught. He said, "Don't operate; you are in a dangerous position."

Perhaps in the more public view I was, but I didn't feel I was any worse off than any of the other amateurs in the Sudan. We made an appointment for Monday to get together.

On Sunday, I was flat on my back with illness, all day long too weak to operate. After eighteen hours of sleep I opened up on Monday morning at 3:30 am and by luck the 80 meter band was wide open to the U.S., one of those great days. I put 105 U.S. QSO's into the log and even heard W6KUT coming through at 5x5 from San Diego. This was my first W6 shortpath from ST2 and Ed's fortieth Zone on 80 meters. I had been his thirty-eighth Zone from 8Q7 and thirty-ninth from J20. Also in in the log was N7RK's booming signal from Arizona at 5x7. It was really a great day.

I saw Dr, Sid at three in the afternoon. He was angry; "How can you come to the Sudan and take green stamps from the young operators here?" This despite my pledge of magazine subscriptions and an amplifier for the club station at 6T1YP in Omdurman.

Since I had been operating at his house the night before I left for the South and had asked his advice, I was confused as to why he had not offered to write some sort of document for me. His response was that I had not specifically not asked him for a document! I knew that Dr. Sid was still angry about the OH2BH QSL and was convinced that hams would visit the Sudan and make a profit from operating in ST2.

I tried to enlighten him on this score, but he retains his belief in the profitability of operating in the Sudan. I felt unfortunate to be following a very controversial DXpedition there. Dr, Sid is so very aware of his delicate position he didn't want to be in the spotlight with me. I was extremely disappointed that the warm reception and friendship I had enjoyed was now changed because of my difficulties in Southern Sudan.

Dr. Sid now wanted me to leave my Dentron MLA-2500 amplifier for the Radio Club in Omduran. I didn't feel that I could do this under these circumstances. It was obvious that Dr. Sid interpreted this as a real lack of interest in promoting amateur radio in the Sudan and therefore advised me not to operate again.

Dr. Sid did give me a prescription for my stomach problem. I hoped that our mutual feelings about my operation were reconcilable.

On Tuesday, I was really ill and did not operate. On Wednesday the band was in very bad shape, as the East Coast of the U.S. could hardly hear me, but at sunrise, W0MJ and some other W9's and W0's were poking through at 5x9 that could not hear me during the previous big two day opening. Still, I managed only 25 stateside contacts.

Wednesday at 5:30 pm local time, I was hearing N6RO and W6RR coming through 5x5 solidly on the longpath. Suddenly, Dr. Sid's voice was heard on the radio. "David, get off the air; you are in danger. Your operation is illegal." I knew what was coming. I shut down immediately, put the rigs in the closet and rook down the vertical. In fifteen minutes there was no evidence of any radio operation. Ten minutes later there was a loud knock on the door. Security had arrived.

"We have been told there is an illegal radio being operated here."

"No", I said, "I have not been feeling very well and was sleeping."

The security people searched the room, found no antenna, but asked about the radio equipment in the closet. I told them it was for hearing the BBC and Voice of America.

"I miss the news very much," I said. They were puzzled, but after some more questioning they left, obviously expecting to find more than what they had found. I had buried the microphone and headphones deep amongst my clothing. I have found that these two items disturbed people here more than anything else.

I decided now to leave the Sudan as fast as I could as I had obviously worn out my welcome. At midnight there were three flashlights nosing around where the vertical had been. I was too sick to care. No one else spoke to me that night. The next afternoon, I had a long visit from "Passport Control", but most of the gear was already on it's way to Paris. A day later, I was too.

Conclusion - Would I make this trip again if I had the chance? The answer is emphatically, yes! I am doing a book of photos in cooperation with the authorities in Yemen and someday hope to operate from there. A single amateur making this trip knows from my experience that two rigs, two tuners, two amplifiers, more spare parts and more antennas would be needed.

I made some lifelong friends with some of the people I met on this journey and treasure some of the great 80 meter openings that enabled a lot of people to work a new country or zone.

Editor's note: Low band log entries for the 6U0KK and N2KK/ST2 operations will follow. These operations provided the faithful with the critical Zone 34 contact on 80 meters that made the 5 Band Worked All Zone Award a reality.

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6U0KK

80 Meters
December 1980
Zone 34

22DEC	1635	YU2HA	59	59
	38	LZ1AC	57	59
	43	SM7LQ	57	46
	45	LZ2CC	58	59
	48	ZL1BUS	56	45
	52	FR0FLO	59	59
	55	ZL3GQ	55	55
	1700	ZL1BIL	55	55
23DEC	0250	EA3SF	59	59
	53	W4ZWE	58	58
	57	W4YJ	57	57
	59	K4CXY	58	56
	0306	W0MLY	58	56
	11	N4WW	56	56
	14	WA1EKV	57	57
	17	N0XA	57	56
	26	N4KE	56	44
	27	W4TJ	55	55
	29	N4KG	55	55
	31	PA0GMW	58	57
	35	OH2BU	57	55
	36	YV1TO	58	58
	47	HI8ECS	55	55
	51	PY1ZAE	55	55
	53	N4ZO	55	44
	0400	W3BGN	56	55
	04	WB4HOK	55	55
	06	K5UR	57	55
	08	W5XZ	57	55
	10	W0CM	58	57
23DEC	0411	A7Xd	59	57
	16	K2BT	56	56
	18	W9ZR	57	56
	19	K9WZB	57	55
	21	AC0A	56	55

N2KK/ST2 • 80 Meters • December 1980 • Zone 34

18DEC	1416	SM6LRP		55
	16	N2CdM		
	17	N8BIB		54
	17	WA4OOH		57
	18	W4TXQ		–
	19	KB4OW		
	20	K5CTG/4		
	20	AI4W		
	20	K3OIH		
	21	YU1QAG		
	21	WD3IXF		
	22	KC4LQ		
	22	W1ZLG		57
	22	4X6AG		
	23	K3LYK		
	24	WD4GBW		
	24	WA4SZZ		57
	25	EA3BOE		
	25	WA9BHH		
	26	SM4LMV		
→	1450	DF3NZ/ST2		
	53	ST2SA		
	55	4Z4DX		
	59	OH7OK	58	58
	1506	YU1CXA		
	07	ZZ1KdP		
	19	FR0FLO	57	55
	24	YO3JW	58	58
	39	W6OG	55	44
	43	N7ZR	55	33

18DEC	1544	W7AQB	55	44
	47	VE7IG	55	55
	48	W7IVX	56	55
	50	AA7C	56	55
	53	VE7VF	55	55
	57	A7Xd		
	1603	FR0FLO		
	03	YU1ABH		
	04	OZ3PZ	58	57
	06	YU5RU		
	07	DJ1NY	58	58
	08	YU1OPF		
	08	OR6JG		57
	09	YU2CCY	58	58
	10	YO7APJ	58	
	11	YU4AAH		57
	14	YU5FRK		
	15	IT9KZW		57
	16	YO2APY		57
	17	YU5FAA		57
	27	SP5PBE		57
	28	YU2HA		
	34	ON5DQ	56	56
	34	YO8FZ	56	56
	35	DJ3CN	58	57
	36	DL7YS	55	56
	36	I0KHY	55	58
	37	Y57WJ	55	57
	38	OZ1CTK	55	57
	40	OH1HB	56	57

18DEC	2128	JH3LCX		
	31	JA9Kd		
	32	G3FPQ		
	34	JE7WRM/7		
	34	JA1JWP		
	36	JR4DZR		
	37	JA6ACZ		
	38	JA2AAQ		
	39	JA4AFT		
	44	JA5CPL		
19DEC	0322	K2LWR		
	23	K2BT		58
	24	W2KN	57	46
	26	W1FC		58
	28	W4YJ	58	45
	32	N3II	57	55
	33	K3HP	55	45
	34	W1Ody	57	57
	35	N2MF	56	55
	36	N1ZZ	57	57
	37	W2RS	55	56
	38	YV1TO	56	57
	39	K2FL	55	54
	40	KP2A	57	55
	40	W1NG	56	58
	41	K2FV	58	58
	42	VE1A/H	57	57
	42	N4WW	57	57
	43	K1DXJ	58	57
	47	WA1EAV	59	59

19DEC	0347	K4WZB	59	52
	48	W9ZR	56	51
	48	K2TV	55	55
	49	K1AP	56	55
	50	WA1OWF	57	56
	50	K2CS	55	55
	51	DF3YS/W1	58	58
	52	K1NW	58	58
	52	W2OKM	56	55
	53	W1LQQ	57	58
	55	KA1CI	57	57
	57	N4KE	56	55
	0400	W0MLY	55	55
	02	K3RX	57	55
	03	N2SS	56	55
	04	K4CIA	58	55
	04	N4VG	56	57
	05	AA4BA	57	57
	06	W1ZE	58	57
	07	K4CLB	57	56
	09	K4JY	58	57
	14	VE2JV	56	58
	15	N4KG	57	57
	15	K4CXY	57	57
	16	N4ZWE	58	59
	18	AC0A	57	55
	20	W0XA	57	55
	21	K5YY	56	44
	25	N4JJ	55	57
	26	AD8I	57	56

19DEC	0426	K1KI	59	57
	31	KB4O	57	55
	31	N2SM	57	56
	32	AA4A	56	53
	33	W0MJ	59	58
	34	AA4MM	55	56
	35	K8Wd	55	33
	35	K8GG	55	55
	36	W5XZ	57	57
	37	K9AJ	57	44
	38	HK0FBF	55	55
	39	YS9RVE	56	57
	43	K2BU	57	57
	45	W2HPF	57	57
	46	W1LJ	55	56
	47	K4LTA	55	55
	47	K5UR	55	55
	48	W1XX	56	55
	49	K1MM	56	56
	50	K3JG	57	58
	50	W1CKA	57	57
	51	WA1UVX	55	55
	52	KC4U	55	55
	53	K1RQ	57	57
	53	W2LT	59	55
	54	K1DA	55	55
	55	AB0X	56	54
	56	VE3BZ	55	55
	57	AI5B	55	55
	57	W3UJ	55	57

19DEC	1458	K5MEI		52
	1500	CT1ATK		
	01	KC4OR		55
	03	WD4HRO		
	05	WB4VIA		57-8
	06	KR4F		57
	07	W1RR		58
	1523	N6ZV	55	56
	25	ZL1BUS		58
	27	VU4VBL	56	56
	36	W6OG	56	55
	37	W6TSQ	55	55
	42	AA6AA	44	33
	42	N6DX	55	55
	45	N2KK/6	55	55
	48	KH6nd	56	55
	1603	SM7BIC	59	59
	04	YU5CZ		
	05	YU4VBR		
	05	SM7LQ		
	06	YU2CTd		
	07	YU1OSW		
	08	OK1MSN		
	22	YU1NYP		
	23	OK1DLA	56	
	23	OK1TA	57	57
	24	OK1DIB	55	57
	24	OK1DOS	57	58
	25	OK1JCN	55	55
	25	LZ2CQ	59	56

N2KK/ST2 • 80 Meters • Dec/80 - Jan/81 • Zone 34

19DEC	0458	K4DY	55	52
	57	CT1FL	55	55
	0500	K8LZ	55	44
	01	K5NA	55	55
	03	KC0B	55	54
	04	WB0OQV	55	55
	05	N0PGI	55	55
	06	W3EZJW	55	44
	06	N8ABL	55	55
	07	K2LP	55	54
	12	KC8E	55	44
	14	K4UTE	55	44
	14	W2UE	55	33
	0627	DL3AO	54	5[illegible]
	28	DL8MAE		
	30	VK8NTT		54
	32	UA9UKL	58	58
	32	YU2CHI		
	33	UB5QHJ		
	33	JA6EHP		
	34	UA3DIX		
	35	SM3HLL		55
	36	JH7LVK		
	37	UI8GAF		
	38	JA5EGI		
	39	JA4KWU		
	40	UB5XBC		
	41	I1KIX		
	42	JA5SPQ		
	43	UA9MAZ		

20DEC	1456	UD6CN	599	599
	59	VK6HD	579	579
	1500	W6PT	569	569
	08	SM5BLA	589	589
	17	K6AC	569	559
	20	AA6AA	559	589
	1533	ZL1BQd	57	57
	34	ZL1ACI	57	57
	36	K7ZR	57	57
	39	W7FU	57	57
	42	N7ZR	55	55
	48	N7AM	55	55
	54	VE7IG	56	56
	1600	VK6XI	58	59
	00	VK6IR	58	59
	01	VK7AE	55	57
	03	VK2VW	55	55
	05	ZL1BUK	55	59
	07	ZL3GQ	56	57
	09	ZL2BGJ	55	55
	10	ZL1AZV	57	58
	12	ZL1AQO	56	56
	16	LZ2KTS	58	59
	17	OH1NM	59	57
	19	HB9AMO	57	59
	25	DA2DC	55	57
	27	F6CKH	55	57
	28	ON6HE	55	55
	29	HA5KFL	59	59
	29	YU5JQR	59	59

21DEC	55	KA0BJI	56	56
	57	N8II	59	53
	59	WB4VNZ	59	56
	1900	K9GX	58	55
5JAN	0242	SM6BdJ	57	57
	43	K2LWR	59	59
	44	SP9CB	59	59
	45	N8II	57	57
	46	K8DB	58	58
	48	W4ZWE	59	59
	53	VE3ICR	57	57
	55	WB8VFA	56	44
	57	WB2FZO	59	58-9
	59	N3Rd	57	55
	0300	KG4W	57	56
	02	AF3P	58	58
	03	W9BGN	58	55
	03	HI8MRF	58	55
	09	VE3GCO	57	55
	09	W4DR	58	57
	11	VE1AVX	58	55
	12	AE0K	57	55
	14	K2BW	58	58
	16	KT4G	58	55
	17	K3TW	58	57
	19	K4LSP	59	55
	20	N4CC	58	55
	20	W3KFQ	58	57
	21	VO3APR	57	57

5JAN	0322	AC4B	57	55
	24	K5KLA	57	54
	25	W5ZPA	57	36
	28	W5APX	57	36
	29	W34CTF	59	58
	31	K2BT	59	59
	33	WA4FBH	57	46
	36	W2BXA	58	56
	36	WA1EKV	59	59
	38	WB5UIH	57	33
	39	KM5H	56	44
	42	W0PGI	55	55
	43	W6CM	55	44
	46	WA4FFW	56	22
	46	W2JB	58	56
	49	K2BA	56	56
	49	W1XK	44	33
	50	K1FWF	56	56
	51	W1BL	57	44
	52	W1ZY	56	56
	53	W2PK	54	44
	53	K2JH	57	45
	54	K2CL	56	56
	54	K2PZ	56	46
	56	K1DA	56	56
	58	AI8S	56	55
	0400	K8UR	56	46
	01	N4ABZ	56	46
	02	N4WJ	56	55
	03	N4SZ	55	54

5JAN	0404	W4SWB	56	55
	05	KA4BET	55	53
	06	WA4TLI	55	54
	07	WB3EKV	55	55
	10	W3NF	55	55
	11	K5BG	55	53
	12	W7FG	56	44
	13	K9BWQ	56	44
	14	W2WZ	55	55
	15	K5UC	55	33
	17	W6KUT	55	33
	18	VE1BMW	55	44
	19	N7RK	56	55
	22	W0Sd	56	55
	23	WA7ABZ	56	55
	24	K9QFR	56	55
	25	KB8MR	58	58
	26	W7XA	56	44
	27	K7SP	55	33
	30	W5YU	55	44
	33	W6TER	44	44
	34	K6TM	33	33
	36	K9EL	58	56
	37	K9XR	58	46
	37	AF5K	59	59
	38	K5FUV	59	59
	40	W5ID	57	57
	42	WB9DEX	57	57
	43	WA0SJK	56	56
	44	W6QBX	44	33
8JAN	0445	K0ZE	57	55
	46	VE3II	56	33
	46	F2YS/W2	56	44
	47	K0CS	56	44
	49	W6GO	44	33
	50	?? IIR	55	52
	55	AI9J	55	23
7JAN	0335	SP4PIN	59	57
	0347	DJ9KC	59	58
	0353	7Z2AP	59	59
	0400	DF3GY	59	58
	02	DL2YAP	59	59
	04	YO3AC	59	59+
	05	WA1EKV	58	55
	08	W2LT	57	55
	16	AE3T	55	33
	17	K2BT	59	56
	20	N4PB	55	33
	21	I1APQ	59	59
	22	AI9J	58	57
	23	W9OFV	57	55
	24	AI9F	57	55
	25	W1CKA	59	58
	26	KM5D	57	55
	27	N4VF	56	44
	29	WD9AHJ	56	44
	31	W1SD	58	55
	33	AI2C	55	55
	35	W0WP	56	55
	36	WB9TIY	57	57
	37	AI9R	56	55
	39	W0YZS	56	55
	40	N4RR/0	55	44
	48	W0MJ	59	58
	48	KB8O	56	33
7JAN	1539	N6RO	55	55
7JAN	1541	W6RR	55	44

LOW BAND MONITOR POWER SPOTS - APRIL 1994

TNX: N8BJQ - DAYTON HAMVENTION SPECIAL - AJ6T- WB9Z - N2KK

160 METERS

1822.2	ZL1AA	06-Apr-94	0216Z
1824.0	HR1LW	02-Apr-94	1121Z
1824.0	HR1LW	07-Apr-94	1045Z
1824.3	DK5SO	02-Apr-94	0429Z
1826.5	ZA1AJ	09-Apr-94	0400Z
1827.0	OK1AVB	02-Apr-94	2340Z
1827.0	Z21HS	10-Apr-94	0355Z
1827.4	OX3TT	10-Apr-94	0417Z
1828.0	S59A	02-Apr-94	0427Z
1828.1	YO3APJ	07-Apr-94	0330Z
1828.8	LZ1WRD	07-Apr-94	0229Z
1829.0	SM5EDX	01-Apr-94	0420Z
1829.4	DK7SU	02-Apr-94	2343Z
1830.0	LZ1WR	17-Apr-94	0304Z
1830.0	YO3APJ	05-Apr-94	0340Z
1830.3	YU7AU	09-Apr-94	0325Z
1830.4	HP1XBH	02-Apr-94	1031Z
1830.5	IT9ZGY	14-Apr-94	0343Z
1831.1	IT9ZGY	07-Apr-94	0415Z
1831.1	YU7AU	07-Apr-94	0355Z
1831.3	IT9ZGY	05-Apr-94	0435Z
1831.3	TI2PZ	09-Apr-94	0303Z
1831.4	TG9AC	09-Apr-94	0948Z
1831.4	ZS5LB	07-Apr-94	0404Z
1831.5	SM5EDX	24-Apr-94	0239Z
1831.7	4X4NJ	09-Apr-94	0300Z
1831.7	F6BWO	02-Apr-94	0314Z
1831.9	IT9ZGY	10-Apr-94	0406Z
1832.0	4X4NJ	10-Apr-94	0338Z
1832.0	4X4NJ	11-Apr-94	0308Z
1832.0	YU7BW	01-Apr-94	0420Z
1832.2	DK7SU	14-Apr-94	0400Z
1832.2	EA3VY	09-Apr-94	0512Z
1832.4	IT9ZGY	11-Apr-94	0338Z
1832.5	YU7AU	05-Apr-94	0331Z
1832.8	DK7SU	02-Apr-94	2322Z
1833.0	**AH8A**	**03-Apr-94**	**0948Z**
1833.0	IT9ZGY	01-Apr-94	0341Z
1833.0	IT9ZGY	14-Apr-94	0414Z
1833.0	LZ1WR	09-Apr-94	0333Z
1833.6	OE5KE	07-Apr-94	0410Z
1833.6	SM6CPY	10-Apr-94	0337Z
1833.8	SP5INQ	05-Apr-94	0331Z
1833.9	SV8ZS	10-Apr-94	0353Z
1834.0	SM7CKZ	02-Apr-94	2338Z
1834.1	DK7SU	07-Apr-94	0405Z
1834.1	IV3PRK	02-Apr-94	0416Z
1834.4	UA0CT	06-Apr-94	0306Z
1834.6	DK7SU	01-Apr-94	0419Z
1834.8	GD4BEG	07-Apr-94	0519Z
1835.0	SV8ZS	02-Apr-94	0309Z
1835.0	SV8ZS	02-Apr-94	0349Z
1836.5	CL6TO	09-Apr-94	1047Z
1837.9	FK8CP	02-Apr-94	0929Z
1838.0	FK8CP	16-Apr-94	1002Z
1838.5	CK6TO	09-Apr-94	1047Z
1839.9	EA8PP	01-Apr-94	0419Z
1840.0	EA3VY	09-Apr-94	0528Z
1840.0	G3YRO	02-Apr-94	0544Z
1840.0	IK1MNJ	07-Apr-94	0434Z
1840.0	OZ1DPR	04-Apr-94	2340Z
1840.0	SV8ZS	09-Apr-94	0228Z
1840.0	SV8ZS	17-Apr-94	0314Z
1840.0	ZL2JR	07-Apr-94	0600Z
1841.3	4L1AA	05-Apr-94	0219Z
1841.3	I6NOA	02-Apr-94	2342Z
1841.4	IT9ZGY	09-Apr-94	0314Z
1842.8	G4XVZ	05-Apr-94	0520Z
1842.9	ZL2JR	09-Apr-94	0603Z
1843.0	I8DUB	01-Apr-94	0353Z
1844.0	EA8PP	02-Apr-94	0429Z
1844.0	HB9CXZ	02-Apr-94	0428Z
1845.0	EA5CW	07-Apr-94	0535Z
1845.0	S59A	14-Apr-94	0336Z
1845.9	CT1UP	09-Apr-94	0526Z
1846.1	EA5CW	09-Apr-94	0543Z
1846.8	HB9CXZ	01-Apr-94	0339Z
1908.0	JH1HDT	02-Apr-94	1347Z

80 METERS

3500.4	CX3AN	07-Apr-94	0320Z
3502.7	LZ2PP	24-Apr-94	0353Z
3502.9	BV4ME	14-Apr-94	1257Z
3504.0	LU2BRG	09-Apr-94	0945Z
3505.1	9M0A	04-Apr-94	1408Z
3506.0	OE7WRH	02-Apr-94	0143Z
3506.6	T91EVC	17-Apr-94	0230Z
3508.4	S51OI	24-Apr-94	0402Z
3509.4	OM3TDO	02-Apr-94	0413Z
3509.6	Z32JA	03-Apr-94	0038Z
3511.2	PZ1AP	05-Apr-94	0213Z
3511.8	T99W	05-Apr-94	2242Z
3512.7	Z31GX	03-Apr-94	0020Z
3785.5	5B4YY	02-Apr-94	0335Z
3787.7	YS1AG	14-Apr-94	0440Z
3788.0	FM5DN	09-Apr-94	0606Z
3788.0	OK1AFB	11-Apr-94	0232Z
3788.2	OE2BZL	09-Apr-94	0444Z
3789.7	SP9NSY	02-Apr-94	0205Z
3789.8	Z31PK	17-Apr-94	0307Z
3790.0	5B4YY	05-Apr-94	0239Z
3890.0	V73OR	23-Apr-94	1138Z
3790.1	5B4YY	05-Apr-94	0141Z
3790.1	SP1PEA	24-Apr-94	0325Z
3790.2	AH8A	14-Apr-94	1026Z
3791.5	FG5FC	10-Apr-94	2243Z
3791.6	HC4L	09-Apr-94	1006Z
3791.7	HB9IQP	24-Apr-94	0418Z
3791.8	SO8IF	03-Apr-94	0016Z
3791.8	V63JC	09-Apr-94	1020Z
3792.0	3X0DEX	16-Apr-94	0213Z
3792.1	C31OF	09-Apr-94	0007Z
3793.0	HK0SXV	18-Apr-94	0122Z
3793.3	AH0AM	24-Apr-94	0920Z
3793.3	V63JC	24-Apr-94	0930Z
3793.4	V63JC	24-Apr-94	1021Z
3793.9	XQ8ABF	13-Apr-94	0527Z
3794.0	C31OF	17-Apr-94	0104Z
3794.0	JY5MB	07-Apr-94	0244Z
3794.0	YO5ODE	05-Apr-94	0256Z
3794.1	X5BYZ	07-Apr-94	0301Z
3794.5	T97T	11-Apr-94	0114Z
3794.8	HK0OEP	14-Apr-94	1043Z
3794.9	HK4DHR	16-Apr-94	0955Z
3795.0	A22BW	05-Apr-94	0434Z
3795.0	HC1XM	16-Apr-94	1020Z
3795.0	HK0OEP	14-Apr-94	1053Z
3795.0	V63JC	10-Apr-94	1203Z
3795.1	V44KM	13-Apr-94	0232Z
3795.2	HK4DHR	09-Apr-94	0948Z
3796.0	CT1ESO	06-Apr-94	0327Z
3796.8	C31OF	16-Apr-94	2313Z
3797.0	VK7AZ	09-Apr-94	1106Z
3797.1	Z31PK	11-Apr-94	0344Z
3797.5	G0GXT	14-Apr-94	0055Z
3797.6	V73OR	03-Apr-94	1115Z
3797.7	C31LD	09-Apr-94	0316Z
3797.7	CE8EIO	04-Apr-94	0126Z
3797.9	TI5RLI	17-Apr-94	0506Z
3798.0	C31LD	09-Apr-94	0322Z
3798.0	FG5FC	04-Apr-94	2343Z
3798.0	LZ1KOZ	17-Apr-94	0054Z
3798.0	**TU5DX**	**09-Apr-94**	**0003Z**
3798.1	Z31PK	09-Apr-94	0401Z
3798.2	VP9HG	17-Apr-94	0311Z
3798.5	FY5KE	14-Apr-94	0201Z
3798.7	ZL4BO	13-Apr-94	1014Z
3799.0	AH8A	14-Apr-94	0636Z
3799.3	OE2BZL	10-Apr-94	0433Z
3799.3	SV1EX	10-Apr-94	0136Z
3799.5	EA4AI	19-Apr-94	0517Z
3799.5	XQ8ABF	14-Apr-94	0325Z
3799.6	C31OF	10-Apr-94	2245Z
3799.7	FO4CI	10-Apr-94	1101Z
3799.8	C31LU	10-Apr-94	2350Z
3799.8	T97T	11-Apr-94	0310Z
3800.0	FY5GJ	04-Apr-94	0344Z
3800.0	SV1EX	24-Apr-94	0344Z

40 METERS

7000.3	FO5OU	16-Apr-94	0755Z
7000.4	Z32JA	10-Apr-94	2324Z
7000.5	EA6ACC	10-Apr-94	2338Z
7001.4	ZK2DX	23-Apr-94	1050Z
7001.5	GS0STB	28-Apr-94	0522Z
7001.8	LZ1LZ	24-Apr-94	0044Z
7002.3	A22MN	09-Apr-94	2120Z
7002.6	PY7ZZ	17-Apr-94	0316Z
7002.8	LA1VFA	26-Apr-94	0418Z
7002.8	Z21HS	16-Apr-94	0422Z
7002.9	UX1HA	16-Apr-94	2244Z
7002.9	VP2EY	11-Apr-94	2340Z
7002.9	ZS4XJ	18-Apr-94	0104Z
7003.0	FG5FR	12-Apr-94	0325Z
7003.0	I1YRL	23-Apr-94	0456Z
7003.0	T28RW	20-Apr-94	1117Z
7003.0	YS1XS	12-Apr-94	1227Z
7003.0	Z31GX	10-Apr-94	0010Z
7003.2	YO4AB	19-Apr-94	0110Z
7003.4	T28RW	26-Apr-94	1031Z
7003.4	VU2XTO	18-Apr-94	1252Z
7003.4	ZA1AJ	10-Apr-94	2200Z
7003.6	EA6ZY	16-Apr-94	2319Z
7003.6	OA4AWE	14-Apr-94	0723Z
7003.6	T94US	11-Apr-94	0044Z
7003.6	Z21HS	09-Apr-94	0432Z
7003.7	BV1BI	03-Apr-94	1251Z
7003.8	FY5YE	21-Apr-94	0535Z
7003.8	HB9ATA	14-Apr-94	0457Z
7003.8	S51WA	16-Apr-94	0104Z
7003.8	T92A	10-Apr-94	2032Z
7003.8	T94UN	11-Apr-94	0050Z
7004.0	OA4AWE	14-Apr-94	0827Z
7004.0	ZK2DX	24-Apr-94	1056Z
7004.3	VQ9SS	10-Apr-94	1246Z
7004.9	Z31PK	12-Apr-94	0032Z
7005.0	5W1GC	25-Apr-94	0852Z
7005.0	**9M0A**	**02-Apr-94**	**1526Z**
7005.0	JT1BH	02-Apr-94	2346Z
7005.5	5W1GC	24-Apr-94	0624Z
7005.5	7P8SR	09-Apr-94	0447Z
7006.4	3B8CF	28-Apr-94	0242Z
7006.5	9J2BO	11-Apr-94	0442Z
7007.0	BV1FF	05-Apr-94	1339Z
7007.3	P29DX	14-Apr-94	1229Z
7007.4	9I2Z	05-Apr-94	0424Z
7007.6	HS8AS	10-Apr-94	1432Z
7007.7	5W1GC	28-Apr-94	0605Z
7007.9	FR5DN	09-Apr-94	1221Z
7008.0	LZ1QI	14-Apr-94	0309Z
7008.0	PZ1DV	23-Apr-94	0420Z
7008.2	TA3D	23-Apr-94	0317Z
7009.1	VU2HBI	19-Apr-94	0016Z
7009.4	PZ1DY	01-Apr-94	0748Z
7009.5	4Z5DS	02-Apr-94	2338Z
7009.5	ES1WN	22-Apr-94	0456Z
7009.6	ZB2A	10-Apr-94	0557Z
7009.6	ZB2AZ	10-Apr-94	0553Z
7010.0	BV2TA	10-Apr-94	1413Z
7010.0	HK0ER	09-Apr-94	0140Z
7010.6	8P6AU	19-Apr-94	0012Z
7011.0	OA4CIH	17-Apr-94	0506Z
7011.1	ZA1AJ	26-Apr-94	0425Z
7011.6	FS5PL	16-Apr-94	0332Z
7011.6	RZ3AZO	24-Apr-94	0354Z
7012.1	C53HG	24-Apr-94	0810Z
7012.8	LZ1KDP	10-Apr-94	0043Z
7013.0	9A2PM	22-Apr-94	0439Z
7013.0	V73C	23-Apr-94	1123Z
7013.6	BZ5HAN	02-Apr-94	1340Z
7014.0	ES1WN	23-Apr-94	0348Z
7015.0	VP8GAV	02-Apr-94	0103Z
7015.5	9Y4VU	10-Apr-94	0044Z
7023.6	Z21CA	10-Apr-94	1358Z
7028.5	5W1GC	26-Apr-94	0549Z
7043.2	5X1C	04-Apr-94	2128Z
7043.2	9G1SD	04-Apr-94	2128Z
7047.0	A92BE	04-Apr-94	2041Z